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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/694,256

10/27/2003

Jan Mink

15436.247.31.1

2694

22913

7590

03/24/2005

WORKMAN NYDEGGER
(F/K/A WORKMAN NYDEGGER & SEELEY)
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EXAMINER

KIM, JOANNE H

ART UNIT

PAPER NUMBER

2883

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/694,256	Applicant(s) MINK, JAN	
	Examiner Joanne H. Kim	Art Unit 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 23-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22, 33 and 34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/4/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “the substrate comprises a multi-layer ceramic substrate” in claim 17 and “the substrate comprises a multiplayer construction and includes a strip of metal disposed within the substrate” in claim 33 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-8, 13-16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (U.S. Patent No. 6,731,424) in view of Jiang et al. (U.S. Patent Pub. No. 2003/0031430, hereinafter "Jiang").

4. Regarding claims 1, 4, 6, 7, 13 and 16, Wu discloses a housing (210) for an electro-optic device comprising: a substrate (214); and an electro-optic device (semiconductor optical amplifier chip, 136) mounted over the substrate, the electro-optic device having a first port and a second port (Fig. 21).

Wu does not disclose that the package includes a cap that forms a hermetic seal around the electro-optic device and the cap includes a first window and a second window.

Jiang discloses a package for an electro-optic device including: a substrate; an electro-optic device mounted over the substrate (204 or 212); and a cap/can (202 or 210) including a light transmitting window or lens (208 or 216) mounted on the substrate that forms a hermetic seal around the electro-optic device, thus forming a TO packaged electro-optic device to seal out contaminants and to provide low-cost smaller package (Figs. 2A and 2B, and paragraph [0023]).

It would have been obvious to one of ordinary skill in the art to modify Wu to use a cap forming a hermetic seal around the electro-optic device, thus forming a TO packaged electro-optic device such as that taught by Jiang in order to seal out contaminants and to provide low-cost smaller package. Further, it would have been obvious to modify the cap to include two windows, a first window positioned to allow optical coupling between outside of the cap and the first optical port and a second window positioned to allow optical coupling between outside of the cap and the second optical port in order to allow light to propagate between the first optical port and the second optical port.

5. Regarding claims 2, 3 and 13, Wu discloses that the housing includes a first optical fiber (132) and a second optical fiber (134) mounted over the upper surface of the substrate (214); a first lens (170) and a second lens (172) mounted over the surface of the substrate and in optical communication with the first optical fiber and the second optical fiber, respectively; and a housing surrounding the substrate (Figs. 21 and 22).

6. Regarding claim 5, as discussed in paragraph 3 above, the combination of Wu and Jiang discloses the housing for an electro-optic device including the cap that forms the hermetic seal around the electro-optic device mounted on the substrate. Wu also discloses that the housing further includes a mounting plate (212) on the substrate.

The combination of Wu and Jiang does not specifically disclose that the cap is attached to the mounting plate.

It is well known that the hermetic seals are typically made using a seal ring (i.e., mounting plate) to create a solderable surface.

Accordingly, it would have been obvious to one of ordinary skill in the art to attach the cap to the mounting plate.

7. Regarding claim 8, as discussed in paragraph 3 above, the combination of Wu and Jiang discloses the housing for an electro-optic device.

The combination of Wu and Jiang does not disclose that the electro-optic device is supported by a submount on a spacer block.

However, it would have been obvious to modify the combination of Wu and Jiang so that the electro-optic device is supported by a submount on a spacer block in order to provide proper alignment between the electro-optic device and the optical fiber.

8. Regarding claims 14, 15 and 18, as discussed in paragraph 3 above, the combination of Wu and Jiang discloses the housing for an electro-optic device. Jiang also discloses that a housing comprising a TO packaged electro-optic device includes a lid and a bottom portion (Fig. 1D).

The combination of Wu and Jiang does not specifically disclose that the housing comprises plastic material and the substrate comprises a ceramic substrate.

It is well known that plastic material is commonly used for a housing of an electro-optic device module due to its low cost and a ceramic substrate is commonly used for its high thermal conductivity. Additionally, it is well known that a housing of an electro-optic device module includes a lid and a bottom portion.

It would have been obvious to one of ordinary skill in the art to modify the combination of Wu and Jiang to use a housing comprising a plastic material in order to

reduce the manufacture cost and to use a substrate comprising a ceramic substrate to improve heat dissipation.

9. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu in view of Jiang as applied to claim 1 above, and further in view of Gilliland et al. (U.S. Patent No. 6,416,238, hereinafter "Gilliland").

10. Regarding claim 9, the combination of Wu and Jiang as discussed in paragraph 6 above discloses the housing for an electro-optic device including the electro-optic device supported by the submount.

The combination of Wu and Jiang does not specifically disclose that the submount has metal leads.

Gilliland discloses an optical device housing including a submount (40) and an optical device (80) mounted on the submount. Gilliland also discloses that the submount has metal leads (90) for providing electrical connection to the optic device (Figs. 2 and 3; and column 6, lines 29-36).

It would have been obvious to one of ordinary skill in the art to modify the combination of Wu and Jiang so that the submount has metal leads in order to provide electrical connection to the electro-optic device.

11. Regarding claim 10, the combination of Wu and Jiang as discussed above in paragraph 3 discloses the housing for an electro-optic device including the substrate, the electro-optic device mounted on the substrate and the cap that forms a hermetic seal around the electro-optic device.

The combination of Wu and Jiang does not specifically disclose that the substrate comprises a first via hole located within a portion of the substrate enclosed by the cap.

Gilliland discloses that the substrate includes a first via hole (44) for making electrical contact with the electro-optic device in a first region (43) in which the electro-optic device (70) is mounted (Fig. 5; and column 5, lines 36-41).

It would have been obvious to one of ordinary skill in the art to modify the combination of Wu and Jiang to include a first via hole located within a portion of the substrate enclosed by the cap in order to provide electrical connection to the electro-optic device.

12. Claims 11-12, 17 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu in view of Jiang as applied to claim 1 above, and further in view of Kirkpatrick et al. (U.S. Patent Pub. No. 2004/0022476, hereinafter "Kirkpatrick").

The combination of Wu and Jiang as discussed above in paragraph 3 discloses the housing for an electro-optic device including the cap that forms a hermetic seal around the electro-optic device.

The combination of Wu and Jiang does not specifically disclose that the substrate comprises a second via hold located within a portion not enclosed by the cap, a multi-layer ceramic substrate, and a conductive plate disposed within the substrate that electrically coupling the second end of the first via hold with the second end of the second via hole.

Kirkpatrick discloses a package for an electro-optic device including a substrate comprising a multi-layer ceramic substrate (320, 340 and 360) including conductive layers disposed within the substrate, a plurality of vias (308), and an electro-optic device mounted over the substrate (Figs. 5 and 7; and paragraphs [0029] and [0033]).

Kirkpatrick discloses the vias disposed on different locations and different layers of the substrate, including the vias disposed away from the electro-optic component (520).

It would have been obvious to one of ordinary skill in the art to modify the combination of Wu and Jiang to include a substrate comprising a multi-layer ceramic, a second via hole located within a portion not enclosed by the cap, and conductive plates disposed within the substrate that electrically coupling the second end of the first via hole with the second end of the second via hole in order to provide the required electrical connectivity and to provide an interface between optical components and electronic components to utilize the bandwidth provided by fiber optics.

13. Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu in view of Jiang as applied to claim 1 above, and further in view of Kimura (U.S. Patent No. 5,848,210).

14. Regarding claims 19-20, the combination of Wu and Jiang as discussed above in paragraph 8 discloses the housing comprising the ceramic substrate. Wu also discloses that the housing includes a thermo-electric cooler (216).

The combination of Wu and Jiang does not specifically disclose that the ceramic substrate functions as a cool plate of the thermo-electric cooler and the thermo-electric cooler includes a plurality of semiconductor elements.

Kimura discloses a temperature controlled optical coupling structure including an optical coupling substrate (2) functions as a cool plate of a thermo-electric cooler (i.e., Peltier cooler) including a plurality of semiconductor elements (Figs. 3 and 6; and column 4, lines 3-6 and 37-46).

It would have been obvious to modify the combination of Wu and Jiang to include a Peltier cooler using the ceramic substrate as a cool plate such as that taught by Kimura in order to reduce a size of the package.

15. Regarding claims 21-22, the combination of Wu and Jiang as discussed above in paragraph 3 discloses the housing for an electro-optic device. Wu also discloses that the housing includes a thermo-electric cooler (216).

The combination of Wu and Jiang does not specifically disclose that the thermo-electric cooler has a cool plate and a warm plate and that the thermo-electric cooler includes a plurality of semiconductor elements.

Kimura discloses a temperature controlled optical coupling structure including a thermo-electric cooler having a cool plate and a warm plate, wherein the cool plate is in thermal contact with an optical coupling substrate and the warm plate services as a mounting plate for package, and a plurality of semiconductor elements between the cool plate and the warm plate (Fig. 1; and column 3, lines 18-19 and 27-33).

It would have been obvious to one of ordinary skill in the art to further modify the combination of Wu and Jiang to include a thermo-electric cooler having a cool plate and a warm plate, wherein the cool plate is in thermal contact with an optical coupling substrate and the warm plate serves as a mounting plate for the package, and a plurality of semiconductor elements between the cool plate and the warm plate in order to control the temperature of an electro-optic device.

16. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu in view of Jiang as applied to claim 1 above, and further in view of Korn et al. (U.S. Patent No. 6,381,066, hereinafter "Korn").

The combination of Wu and Jiang as discussed above in paragraph 3 discloses the housing for an electro-optic device.

The combination of Wu and Jiang does not specifically disclose that the electro-optic device includes at least one face that is oriented non-perpendicularly with respect to at least one of input and output signal.

Korn discloses a semiconductor optical amplifier system including a semiconductor optical amplifier chip (102) including at least one face that is oriented non-perpendicularly with respect to at least one of input and output signal (Fig. 1B).

It would have been obvious to one of ordinary skill in the art to modify the combination of Wu and Jiang so that at least one face of the electro-optic device is oriented non-perpendicularly with respect to the input or output signals in order to prevent the reflected light from interfering with the input or output signals.

Response to Amendment

17. Applicant's arguments filed on December 22, 2004 have been fully considered but they are not persuasive.

Applicant argues, in page 12, that "there is no motive to modify the Wu device to include the 'cap forming a hermetic seal' purported by the Examiner to be taught by Jiang.... Since Wu purports to teach a hermetically sealed semiconductor amplifier, no apparent benefit would be realized by modifying the Wu device to include the 'cap forming a hermetic seal' of Jiang."

Examiner respectfully disagrees. As stated by Applicant, Wu discloses that the package housing is **preferably** hermetically sealed to protect the semiconductor amplifier device. Wu does not state that the package housing **is** hermetically sealed.

It is well known to hermetically seal an electro-optic device to protect it from the environment. It also is well known that to optimize the package for both operational reliability and cost, TO cans forming hermetic packages are widely used for packaging electro-optic devices. Wu discloses the package housing, which is preferably hermetically sealed, including the electro-optic device and other components such as lenses and optical fibers, thus forming a large package housing. Jiang discloses the TO package that is smaller and cost less than the package housing of Wu. Accordingly, there is motivation to modify Wu to use the TO package such as that taught by Jiang, instead of the large package housing, in order to provide optimized hermetic package for both operational reliability and cost.

Further, even if the package housing of Wu is hermetically sealed, including additional TO package around the electro-optic device can provide the additional protection from the contamination.

Applicant also argues that the device of Jiang includes only a single window while claim 1 requires a cap that includes a first window and a second window.

It is well known that a cap of a TO package includes a window or windows, depending on the number of an optical port of an electro-optic device, to allow light to propagate. Jiang discloses a cap including one window since the electro-optic device is either receiver or transmitter, which has one optical port. Wu discloses the electro-optic device having a two optical port, the first and second optical ports. Therefore, it would have been obvious to modify the cap of Jiang to include two windows in order to allow light to propagate between the first optical port and the second optical port of the electro-optic device of Wu.

Accordingly, Examiner holds to the validity of the references used and maintains rejection.

Conclusion

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joanne H. Kim whose telephone number is (571) 272-2139. The examiner can normally be reached on 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Joanne H. Kim
Examiner
Art Unit 2883

jhk/FGF



Frank G. Font
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